TRANSMITTAL SHEET

TO:

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June 1, 1971

MATERIAL TRANSMITTED

KSC Apollo Program Directive No. 13, dated July 17, 1967; Subject: Summation of Post Accident Changes to Kennedy Space Center Apollo Command and Service Module Test and Launch Facilities.

The objectives of this directive have been accomplished, and it is therefore rescinded.

Thomas W. Morgan
Brigadier General, USAF
Manager, Apollo-Skylab Programs

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KSC HQS.

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KENNEDY SPACE CENTER
Apollo Program Directive

DATE: July 17, 1967

KSC APOLLO PROGRAM DIRECTIVE NO. 13

TO : Distribution

FROM: E R Mathews
Apollo Program Manager

SUBJECT: Summation of Post Accident Changes to Kennedy Space Center Apollo Command and Service Module Test and Launch Facilities

I. PURPOSE

This Program Directive defines necessary changes to Apollo spacecraft tests and launch facilities at KSC, which have been approved by NASA Headquarters. These changes are to be effective for the first manned flight.

II. SCOPE

This Directive covers changes to facilities, equipment, and procedures required as the result of the post accident design reviews.

III. REFERENCE

1. Apollo Program Directive No. 29, Subject: "Post-Accident Changes to Apollo Command and Service Module and Related Ground Facilities."

2. KSC Apollo Program Directive No. 11, Subject: "Preparation and Management of Kennedy Space Center Test and Checkout Plans and Procedures," dated June 2, 1967.

IV. APPLICABILITY

The changes for all facilities, equipment, and procedures shall be effective for all manned spacecraft testing and launches at Kennedy Space Center.

V. KSC ACTIONS REQUIRED - FACILITIES

All changes shall be made on Launch Complex 34 and the KSC Industrial Area to support the first manned flight. Proposed detailed schedules for implementation of all changes on both LC 34 and LC 37 and the KSC Industrial Area shall be submitted to the Apollo Program Director by August 15, 1967. LC 39 shall be reviewed in light of the Apollo 204 Accident and any necessary changes submitted to the Apollo Program Director for review by September 1, 1967.

A. EMERGENCY EGRESS

1. The Launch Umbilical Tower and Access Arm shall be modified to improve emergency egress:

   a. Modify the adapter hood to accommodate the new CM hatch

   b. Modify the mechanism and provide an intermediate park position to shorten the reposition time of the Access Arm.

   c. Eliminate steps and protrusions in the egress path which could hinder rapid emergency egress.

   d. Provide bi-directional swinging doors for the Access Arm.

   e. Provide for positive ventilation for the Access Arm Environmental Chamber.

   f. Provide additional lighting in the Access Arm Environmental Chamber to illuminate the CM hatch.

   g. Provide redundant power for lighting in the Access Arm Environmental Chamber.

   h. Provide fire resistant materials in the Access Arm Environmental Chamber.

2. Vacuum Chamber Area: Necessary changes in design and procedures shall be implemented to provide effective emergency egress during tests in KSC vacuum chambers before the resumption of manned testing.

3. Training Facilities: KSC shall provide a mockup of the CM Access Arm to mate with the CM mockup which is to be supplied by MSC for egress training.

B. LAUNCH COMPLEX EMERGENCY EQUIPMENT

Adequate provisions shall be made for emergencies including:

1. Installing a ground override capability on the number 4 elevator.

2. Adding permanent explosion-proof lighting to the spacecraft GSE at the base of the Service Structure.

3. Installing additional warning lights and audible devices.

4. Providing additional gas masks, protective clothing and emergency tools.

5. Providing additional exhaust fans.

These provisions shall be re-examined as changes in procedures or configuration make it necessary, and personnel shall be trained in their use.

C. ON-BOARD TV MONITORING

Provisions shall be made for monitoring and recording crew operations inside the CM during hazardous tests using the on-board TV camera.

D. GROUND COMMUNICATIONS

1. The following procedural changes shall be made:

   a. Minimum requirements for access to the system shall be defined and continuing access control procedures shall be established.

   b. The configuration and operational readiness of the communications system shall be inspected and verified by test before each major space vehicle test.

   c. Throughout all major space vehicle tests, communication systems engineers with knowledge of the entire voice system shall be on duty.

   d. Continuous recordings of critical voice communication loops shall be obtained during major tests.

   e. A comprehensive method of documenting and controlling the configuration of the intercommunication system shall be implemented.

   f. Operating characteristics shall be reviewed with personnel prior to their use of the system.

2. The following equipment changes shall be made:

   a. Modify the astronaut communication consoles in the Launch Complexes to eliminate the undesired coupling between the voice communication links and to provide full duplex communication to the spacecraft over the umbilical cable without the use of voice operated (VOX) devices.

b. Delete the locking feature on all push-to-talk microphones and remove loud speakers where feasible.

c. Provide for the modification of the input to the Operational Intercommunication System from the unified S-Band (USB) station on Merritt Island so that the proper voice signal levels and noise levels are maintained.

d. Provide headset elements with improved frequency response and increased efficiency.

e. Provide additional central testing facilities to permit continuous circuit quality monitoring.

f. Minimize the use of voice operated (VOX) devices in the Operational Intercommunications System.

g. Augment the present ground Operational Intercommunications System with 4-wire full duplex stations, utilizing the present cable plant where possible, to interconnect the spacecraft, blockhouse, spacecraft checkout station, and the Houston Mission Control Center. The following loops were 4-wire before the AS-204 accident and will remain so:

(1) Flight Director.

(2) Mission Director.

(3) Air Ground No. 1.

(4) Air Ground No. 2.

(5) Recovery Coordination.

(6) Public Information Officer.

The following launch critical loops are to be made 4-wire before manned flight:

(1) Launch Operations Manager.

(2) Spacecraft Test Conductor.

(3) Aero Med.

(4) Spacecraft System Monitor X.

(5) Launch Vehicle System Monitor X.

(6) Launch Vehicle Test Conductor.

(7) CSM Guidance and Navigation,Green 3.

(8) CSM TM, and Instrumentation,Green 6

(9) CSM, ACE Data Link,Green 11

VI. KSC ACTIONS REQUIRED - TEST PROCEDURES

The following procedures will be developed in accordance with Apollo Program Directive No. 11, "Preparation and Management of KSC Test and Checkout Plans and Procedures," dated June 2, 1967, based on Development Center Test Requirements and this Center's operational requirements.

1. Materials Controls for Block II Spacecraft.

2. Materials Placement and Storage for Block II Spacecraft.

3. Usage and Control of Cleaning Material Internal to the Spacecraft.

   a. Procedures for cleaning leaked or spilled coolants without leaving harmful residues.

   b. Procedures for testing to ensure that any harmful residue has been satisfactorily removed.

   c. Procedures for recording coolant leaks and spills, areas affected, and remedial action as a continuation of records documented prior to receipt of the Spacecraft.

4. Emergency Egress Procedures based on hatch redesign and KSC operational requirements.

5. Emergency Procedures for Electrical System Power Down.

VII. REPORTS

Each Directorate shall submit, to the Apollo Program Manager, a monthly report commencing August 2, 1967. This report shall provide status, until closed, on all items under their cognizance specified in this Directive. Any related additional or alternate actions shall be included in this status report.